ONTARIO
FISH AND WILDLIFE
REVIEW

Volume Six, Numbers Three and Four *Fall-Winter, 1967*

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

HON. RENE BRUNELLE, MINISTER G.H.U. BAYLY, DEPUTY MINISTER

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THE COVER

The cover photographs by John Macfie seem fitting accompaniments to his report on the encouraging developments in the Killbear deer yard. Turn to Page 3 for the good news and more forest scenes by Macfie.

ONTARIO FISH AND WILDLIFE REVIEW is published four times per year by the Department of Lands and Forests, Parliament Buildings, Toronto 5, Ontario.

EDITORIAL

Many people have felt in the past that the right to fish is part of the heritage of all Canadians and that a licence for angling is somehow improper since it removes one of our remaining freedoms. There are a few problems with this idea which are worth noting.

In North America, the fishery resources belong to the people and are maintained for them by the Crown or State, while in Europe the ownership of the Fishery is private. The vast Ontario fishery resources, of which we should be justly proud, belong to all of the eight million people of this Province. Only a portion (about one million) of our residents use the resource as anglers and benefit directly from its use. The remainder benefit from the economic and social activity which the fishery generates. The economic activity, alone, was estimated at some $200,000,000 in 1967.

The burden of protecting and managing the fishery has been growing. In 1969, the Ontario angler is going to shoulder more of the responsibility by buying an angling licence and contributing to the conservation of the resource he especially enjoys.

General angling licences are required in eight of the ten provinces of Canada as well as in the Yukon and the Northwest Territories. In the ninth province, Newfoundland, a resident licence is required for salmon, and in the tenth province, Ontario, a resident angling licence for adults and children has been required for many years in Algonquin, Quetico and Lake Superior Provincial Parks. Free fishing, then, has not been shared by other Canadians, nor has it been entirely applicable in all parts of this Province.

The resource must be well managed now by protection and development of the fishery and the aquatic environment. Unless it is, the "right", "privilege" or "freedom"---call it what you may---to fish, with or without a licence, will be meaningless. Increased licence revenues will help to justify the necessary degree of management.

Range improvement produced luxuriant crops of high-quality deer food.

REPLENISHING THE LARDER IN THE KILLBEAR DEER YARD

by John Macfie
Senior Conservation Officer, Parry Sound Forest District
(Photos by the Author)

'Future Bright for Deer Herd' glowed the headline in the December 30, 1958, issue of the Department of Lands and Forests news release. As reported, the facts gathered at hunter checking stations were indeed grounds for optimism. Hunter success was rising in the eastern deer range, and the reproductive rate of deer was high. In the Parry Sound District, for example, where 40 per cent of the adult deer aged were yearlings, plenty of fawns also passed through the check points, evidence that two strong year-classes of potential breeders were entering the herd.

The writer, however, was careful to temper his good news with the warning that much would depend on the severity of the coming winter. He noted that December snows had been heavier than usual. At Parry Sound, on Christmas, 1958, it already lay 27 inches deep.

And it kept on snowing, all winter. That year, the Parry Sound weather station recorded a total fall of 213 inches, nearly double the long-term average. In early March, it was 40 inches deep and crusted. Similar conditions prevailed throughout the eastern deer range. By now, the Department was warning that there would be catastrophic losses of deer before spring thaws released them from their wintering grounds.

The dire prediction was borne out in May when systematic searches for dead deer revealed the gaunt carcasses of a great many that had simply lain down and died in the snow. This was bad enough, but it turned out to be merely blow number one of a one-two punch. The winter of 1959-60 was almost as as severe, and that spring, dead deer surveys (coupled with population estimates based on pellet group counts) indicated winter losses of 25 per cent and higher in the deer yards of Parry Sound District.

Fawns, born and unborn, are hardest hit by winter kill. Heavy losses of 1958, 1959 and 1960 fawns (the breeding stock of the early 'sixties') were reflected by plummeting hunter success that is only now showing signs of reversal.

Those notorious winters had a second, lasting consequence. They prompted the Department to enter a new phase of deer management—manipulation of the range, now called project Deer Range Improvement. Until 1962, deer management in Ontario had consisted largely of regulating and analyzing the annual harvest. The hard winters demonstrated clearly that something must be done about these periodic bottle-necks—deep-snow winters—which dealt increasingly severe blows to the deer herds as the prime deer range, produced by logging, became more mature and less suit-

Before range improvement----no food for deer here.

able for deer.

The basic cause of deer losses was, of course, the lack of adequate food supplies in the right places. Deer, which were imprisoned in coniferous stands by deep snow, soon ate up all of the food within reach. This food supply was not as great as it had been in previous years because the forest was getting older, and the middle-aged hardwood forests (fringing the yards) excluded sunlight and this had choked off ground growth. There was, however, plenty of food only feet away—straight up, in the tops of maples. A few decades earlier, the succulent twigs of these same trees were near ground level and they provided deer with more than ample food. It was this well-nourished deer population that gave rise to the good hunting that old-timers tell us about.

After the two big "die-offs", it was obvious that a deer range improvement program should be instituted in the eastern Ontario range where 100,000 hunters annually seek their form of recreation.

By 1962, firm plans were forming. Fish and Wildlife and Research Branch biologists discussed aims and methods with field personnel. A Head Office team, consisting of representatives of Timber and Fish and Wildlife Branches, surveyed deer yards with district representatives and advised on techniques. Funds were allocated through Timber Branch's Silviculture Section

After range improvement----banquet fare for deer within easy reach.

to get a program under way. In the winter of 1962-63, projects on a limited scale were undertaken; that year, Parry Sound District got $3,000.00 to finance its initial venture.

In the years that followed, increasing effort was expended as methods were refined and a capability to perform the work was developed. Then, in 1967-68, the Ontario program, backed by an appropriation exceeding a quarter of a million dollars, was vastly expanded in scope. In that winter, close to $50,000.00 worth of range improvement work was performed in Parry Sound District deer yards. The shift into high gear marked acceptance of the fact that deer range improvement worked.

The Killbear deer yard, situated in the Georgian Bay shore region of Parry Sound District, served as one of the proving grounds for the concept of increasing the deer-carrying capacity by range improvement methods. This 2,000 acre yard consists of a series of hemlock-cedar-pine stands, surrounded by second-growth red and sugar maple that rose after logging and fire removed the original forest early in this century. Striped maple, a quality deer food, is prominent among shrub species. Deer from Carling Township, and perhaps, two or three others adjoining it, congregate there each winter.

The Killbear herd suffered heavy losses in 1959 and 1960. The size of the pre-crash population is not known, but the fact that observers in an air-

craft counted 60 or 70 deer in a random survey of the yard in March, 1959 (when many had already succumbed to lack of food), suggests that it was substantial. In the winter of 1961-62 (also a fairly severe winter—the third in four years), only about 125 deer wintered there, according to the results of a census based on systematic pellet group counts made after the snow left the ground.

The Killbear yard possessed several features to recommend it as the site of a pilot project in deer range manipulation. It formed the core of a peninsula (jutting into Georgian Bay) which was being developed as a provincial park. All its parts were readily accessible via park roads, and casual park staff offered a winter work force with a convenient base of operations.

The demarcation line between coniferous and hardwood forest was sharply defined, and the hardwood was of uniform composition, suiting the systematic type of treatment envisaged. The terrain was level to moderately rolling, and the soil reasonably fertile, considering it was boulder till. And foremost among its qualifications, the Killbear yard of 1962 could grow very little winter food for deer in its present state.

A ten-year plan of treatment was devised. The object was to place a large quantity of food where deer could reach it in the severest winters. The program called for converting deciduous forests (on the perimeter of several miles of sheltered areas) from middle-aged hardwood to a deer-food-producing brush stage. Treatment would consist of clear-cutting about ten acres of hardwood annually in a narrow band skirting coniferous stands. Broad areas of low-grade hardwood were available in the general area, but it was judged that the most value would be obtained by restricting treatment to a zone within 100 feet of evergreen groves. (Deer are reluctant to break trails farther than that when snow is very deep.)

Cutting commenced in December, 1962. By late January, workmen had cleared 8½ acres in a continuous strip 80 feet wide, partially encircling a 50-acre hemlock-cedar grove, one of several that formed the core of the yard. The operation was virtually a clear cut; only a few isolated evergreens, mostly hemlocks, that occurred in the hardwood, and some potentially high-value yellow birch and red oak stems were left standing.

Killbear deer benefitted immediately. They crowded into the grove centering the operation and enjoyed banquet fare in feeding forays among the lowered tree tops. Coppice growth rose thickly in the sun-drenched clearing the following summer, particularly around red maple stumps. This first crop was of such magnitude that the annual cutting target was reduced.

To maintain the desired pattern of deer dispersal, an alternate patch method replaced strip cutting in subsequent operations. Rectangular plots, measuring 66 by 99 feet, were laid out perpendicular to shelter grove margins; the workmen then treated every second plot, leaving intervening blocks of hardwood for removal in a proposed second cycle. In plots of these dimensions, it was possible for the cutters to drop most tree tops outside their margins, thus avoiding heavy accumulations of deer-excluding brush on food patches. Trees with heavy tops (that would otherwise fall in the plots) were killed by

Clear-cutting bush to permit new growth close to deer yard.

girdling and left standing.

By the winter of 1965-66, four annual cutting projects had converted twenty-six previously barren acres of shelter margin to deer pasture. Four sites, distributed strategically in the Killbear yard, were now growing such luxuriant crops of high-quality deer food that it was apparent a pause of at least two or three years must be declared in the program. Sucker growth around tree stumps was shooting up at the rate of two or three feet each summer. This was too fast for the deer, which can crop off only a foot or so each winter, to hold in check. At the site of the first cutting, choice red maple buds and shoots were already escaping above a deer's six-foot reach.

A high yield of available browse depends on intensive browsing to keep shrub growth low and thick; so, bringing further acreage into production would just increase the waste of quality food and hasten the day when overshading would again choke off ground growth in the treated areas. Furthermore, the relief of browsing pressure on shrub growth throughout the yard was permitting it to recover from over-browsing. Suddenly, there was too much deer food—the result of treating less than two per cent of the yard! The potency of the technique had exceeded expectations.

The winter of 1961-62 marked a turning point for the Killbear herd. Throughout that winter of initial treat-

ment, 8½ acres of succulently budded tree tops lay in the center of the yard, an unprecedented bonanza of food for those deer. Subsequent winters brought more of the same plus a rich crop of new growth in the producing food patches. And, providentially, 1962 marked a return to normal winters, further abetting production and survival of young deer (although one or two hard winters would have one beneficial effect, that of forcing deer to feed more heavily on induced shrub growth, thus holding it in check and producing more twigs per stem).

Yearly wintering population estimates have been continued in the Killbear yard with the exception of 1966, a winter of so little snow that part of the herd did not bother to join the annual migration to winter quarters. The figures indicate a continuous rise in deer numbers since 1962.

Between 1962 and 1967, the population index doubled to 250 animals. True, there was general improvement in the deer picture in much of Parry Sound District during the period, but increases recorded in untreated yards were small in comparison and lacked the uninterrupted character of the growth of this herd.

The Killbear experiment has demonstrated that winter range manipulation is a workable tool of deer management. The cost (in excess of $100.00 per net acre) of turning unproductive land to intensive deer food production proved to be rather high, but on the other hand, 'productivity was greater than expected. When put into use in other District deer yards, in differing forest types and without the systematic application of the pilot project, costs have been lower by as much as 50 per cent. By the same token, it must be remarked that food patch productivity elsewhere has sometimes fallen short of the Killbear norm.

A final assessment of the experiment cannot be made until it is known how long a food patch can be kept productive.

After four growing seasons, some maple, birch and aspen (in the site treated first) were already escaping beyond the reach of the deer; therefore, its productivity was, in a sense, already in decline. As a further experiment, the cycle was re-started in the fifth winter on half the area (the remainder, in alternating blocks, was left untouched for later comparison) by mowing all brush to two levels, 18 inches and 30 inches above the ground. This was accomplished at small cost with brush axes and a power-driven brush saw. A less well provided deer herd might have accomplished this at no cost. The new crop, sprouting from shorn coppices, reinforced by an abundant seedling growth now rising among the old stumps, promises to be more luxuriant than the first. It appears probable that a judicious rate of initial treatment, supplemented, when necessary, by retreatment, will maintain patches in production for many years before they are taken over by shrubs and trees that the deer do not find palatable.

It is not yet possible to calculate the degree of success of deer range improvement. The ultimate test will come with the next 1958-59 type of winter. What can be said with certainty is that Killbear deer are eating well in their 26-acre'garden' and showing it.

PINK SALMON IN LAKE SUPERIOR

by Peter J. Nunan
Fisheries Management Officer, Port Arthur Forest District
(1955 Photos by G.C. Armstrong)

In the fall of 1959 when two fish, taken by surprised anglers in Minnesota streams tributary to Lake Superior, turned out to be pink salmon, *Oncorhynchus gorbuscha* (Walbaum), Canadian and U.S. fishery personnel were puzzled. Now, eight years later, such fish are becoming more common. Last fall, a dozen pink salmon were identified from the Ontario waters of Lake Superior, and others were reported from adjacent Minnesota waters.

When the word, salmon, is spoken, one pictures British Columbia with its great rushing rivers and thousands of salmon fighting their way upstream, leaping rapids and waterfalls and returning to their place of origin, to spawn and die.

British Columbia is still the home of the pink or "humpback" salmon. There, in its native waters—the Fraser, Skeena and other rivers along the coast—it spawns from late September to early November. It may run a considerable distance upstream but generally spawns in the lower stretches of the watersheds. At this time, the males develop a prominent hook on their snouts and a very large hump on their backs which leads them to be called "humpbacks".

The breeding male is dark on the back, red on the sides, and blotched with dark brown, with black spots on the posterior portion of the back, adipose fin and tail. The female is less brilliant.

The mature female deposits from seventeen to nineteen hundred eggs in the gravel and, along with the male, dies after spawning as do all Pacific salmon. The young fry emerge from the gravel in April and May and immediately become free-swimming fish which migrate to salt water. They reach sexual maturity in two years from the time the eggs were deposited. In the sea, they range from northern California to the Bering Sea. Their food consists chiefly of plankton and crustaceans, but squid and fishes may also be eaten.

"Pinks" average from three to five pounds in weight; however, fish up to ten pounds have been recorded. They are taken by commercial fishermen in gill nets, traps and purse seines. Practically all the B.C. catch is commercially canned.

The astonishing occurrence of two fish in Lake Superior in 1959 was the first report of pink salmon in fresh water. Was this some kind of a hoax? It seemed incredible that this species, known only to mature in the salt water of the Pacific, could survive in the cold, soft water of Lake Superior.

In 1954, the Ontario Department of Lands and Forests examined several tributaries of Hudson and James Bays to assess their potential for a Pacific

salmon which could be introduced to establish a much-needed sports and commercial fishery for the Indian population of this area. The two species that showed the greatest promise were the chum salmon, *O. keta* (Walbaum), and the pink salmon. That fall, a million chum salmon eyed-eggs were obtained from the Department of Fisheries in the State of Washington for the Department's hatchery at Port Arthur. Half of these eggs were flown to the Winisk River, and a tributary, the Mishamattawa, in January, 1955, where they were planted through the ice into prepared artificial nests. The remainder, which were cultured at the Port Arthur Hatchery to the fingerling size, were planted in the latter part of May and early June in the Attawapiskat River, a tributary of James Bay.

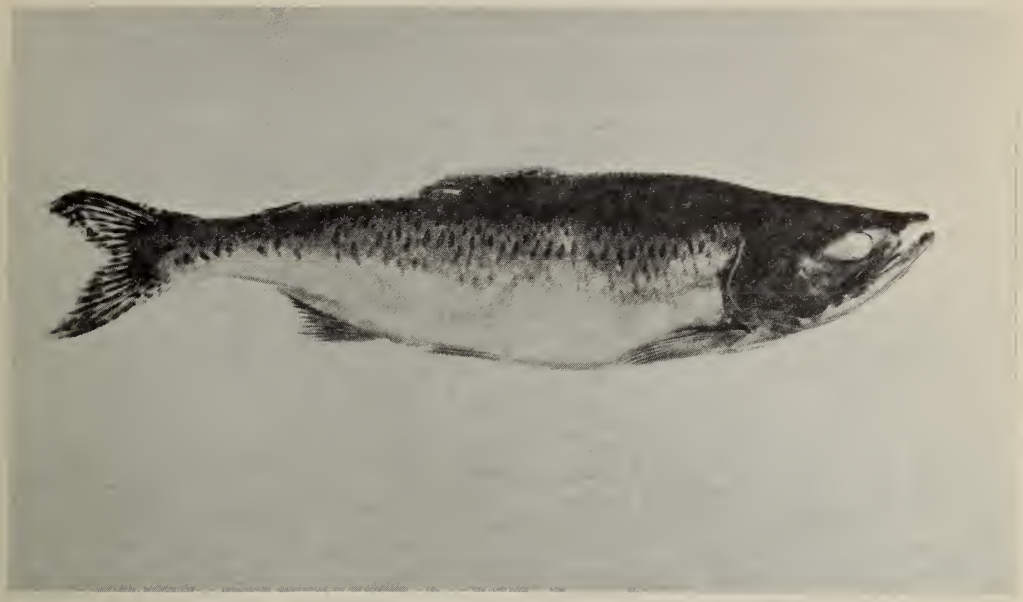
Later that fall, 787,000 pink salmon eggs, collected from the Skeena River in British Columbia, were eyed in B.C.'s Horsefly Lake Hatchery and shipped to the Port Arthur Hatchery to be cultured. By January, 1956, 513,000 eyed-eggs and sac fry were planted in Goose Creek which flows into Hudson Bay. The following spring, 224,000 fingerlings were planted there also.

Intensive surveys were carried out in 1957 and 1958 to locate spawning adults returning to the waters in which they were planted. Unfortunately, adult fish were never located, and most people concerned with the project saw this as an end of the effort to introduce chum and pink salmon into Ontario. It was the end of the chum salmon indeed, but not of the pink. While extensive searchers were being made for spawners in the Hudson and James Bay area in 1957, pink salmon were successfully spawning in Lake Superior tributaries.

As soon as the first two pink salmon were landed, inquiries by fishery officials on both sides of Lake Superior were immediately launched to determine their source. The trail led to the Port Arthur Hatchery where the pink salmon, destined for the project at Hudson and James Bays, had been cultured. An employee of the Department of Lands and Forests remembered that, in the process of loading an Otter aircraft with pink salmon fingerlings, approximately 100 had escaped into the waters of Lake Superior. The hatchery manager, G.K. Manore, had also swept some remaining "pinks" out of the troughs (possibly 350 in number) and planted them in the vicinity of Pie Island. Fisheries workers were not only amazed that pink salmon could survive and reproduce in Lake Superior but were even more surprised that such a small number (approximately 450 fingerlings) could become established.

However, in probing further very recently, it was learned that a much larger number of pink salmon fingerlings had really escaped. A former hatchery employee has recently stated that when the last aircraft-load of fingerlings was flown to the Hudson and James Bay areas, three troughs of fingerlings could not be carried. Each trough had approximately 7,000 fish. These fish, 21,000 in number, were discarded into a sewer leading into the Current River a few yards away.

Of three pink salmon taken from the Ontario waters of Lake Superior in 1961, one was a ripe male taken from Black Bay by William Pawluk, a commercial fisherman; another ripe male with a very pronounced hump was taken by Harry



The first pink salmon taken in Ontario waters of Lake Superior. It was captured in Black Bay in 1961 by Mr. William Pawluk, a commercial fisherman of Dorion. Photo, courtesy of Royal Ontario Museum.

The first pink salmon taken in the Nipigon River. It was caught by Mr. Harry Smutylo, Nipigon angler, in 1961. Photo, courtesy of Royal Ontario Museum.

The arrival of salmon eggs on the Mishamattawa River in 1955.

Preparing redds after blasting, 1955.

Father Gagnon of Winisk and R.A. Ryder, biologist, planting salmon eggs in 1955.

Smutylo, angling in the Nipigon River; and the third was a spent male, taken from the Pigeon River by Thomas Hill, a park employee. The last fish was one of a school of approximately fifty, seen milling about in an erratic manner and being preyed upon by large pike. W.B. Scott of the Royal Ontario Museum corroborated the identification of these fish.

Since the accidental stocking of pink salmon in 1956, other changes in the fishery have taken place in Lake Superior. This year, commercial fishermen have taken other members of the Pacific salmon family from their nets: the Kokanee, *O nerka kennerly* (Walbaum), and the coho, *O. kisutch* (Walbaum). The kokanee were planted in Lakes Ontario and Huron by Ontario in the four years from 1964 to 1967, and the coho salmon were stocked in Lakes Michigan and Superior by Michigan in 1966 and 1967. Both the kokanee and coho salmon hold promise.

Fishery scientists had attempted to stock Pacific salmon in the Great Lakes for many years without success. Spring salmon *O. tshawytscha*, (Walbaum) were planted in Lake Ontario during the years from 1875 to 1882 and again from 1919 to 1925. These plantings failed to establish a permanent population. A coho salmon planting in Lake Erie in 1933 was also unsuccessful.

The pink salmon are here now, but will they survive? We know that six generations have hatched, spawned and died in the fresh, cold waters of the Lake Superior system where they were thought not to be able to reproduce. They may help lead the way in the study of other Pacific salmon and the plantings of kokanee and coho.

It is yet too early to know what value this accidental stocking in 1956 may hold. We must wait until the history of Lake Superior and the pink salmon is written in the years to come.

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EARLY ORGANIZATION OF HUNTING, ANGLING AND CONSERVATION ASSOCIATIONS IN ONTARIO

by C.A. Walkinshaw

The promotion of conservation measures by organized sportsmen is an old tradition in Ontario. For the best part of a century or more, leadership in the conservation of fish and wildlife resources has come from sportsmen, working through clubs and associations of clubs to inform the public of the need for management and to encourage the legislature to authorize appropriate action.

Thus, by November 13, 1890, when the important Royal Commission on Fish and Game was appointed, sportsmen were prepared to offer much of the factual evidence and informed opinion required by the Commission. They returned the bulk of the 2,873 replies to the Commission's lengthy questionnaires, and they were responsible for most of the 283 briefs presented to the Commission at meetings held in 19 centres across the Province.

Dr. G.A. MacCallum of Dunnville, Chairman of the Commission, reported the tremendous interest met by the commissioners at the various meetings. He recorded that most of the answers were made by men whose sole interest was to assist the commissioners in finding the facts about which they were inquiring. His report was presented on February 1, 1892.

Even before this, records show that a game protective society was organized in Campbellford as early as August 29, 1878, with J.W. Dinwoodie as president and S. Stewart Cook as secretary (as reported in the Campbellford Weekly Herald). As early as 1860, posters were being distributed by Toronto sportsmen to encourage compliance with Upper Canada game laws.

The Royal Commission, itself, has been reported as directly due to the energy and keenness of the group headed by Dr. MacCallum. The Commission included A.D. Stewart (secretary) of Hamilton, R.A. Lucas of Hamilton, W.S. Pulford of Leamington, John Mitchell of Guelph, J.H. Wilmott of Beaumaris, A.H. Taylor of Ottawa, R.G. Hervey of Brockville, H.K. Smith of Belleville, and E.W. Thomson of Toronto who resigned "because of removal to Boston."

At that time, there were a number of sporting, hunting and gun clubs in the Province, and many of them were represented at the meetings of the Commission either by their president or, more often, by their secretary. No doubt, there were other clubs in addition to the organizations listed in Table I.

The Anglers' Association of the St. Lawrence River was founded in 1883. Its object was the preservation, protection and perpetuation of game fish in the St. Lawrence River; extensive netting has been going on, and the game

fish were nearly depleted.

The St. Clair Flats Shooting Club was given a lease of the St. Clair flats and the south end of Walpole Island by the Canadian Government in 1876; the club controlled more than 20,000 acres of reserve marsh and were to enforce the no-spring-shooting practice.

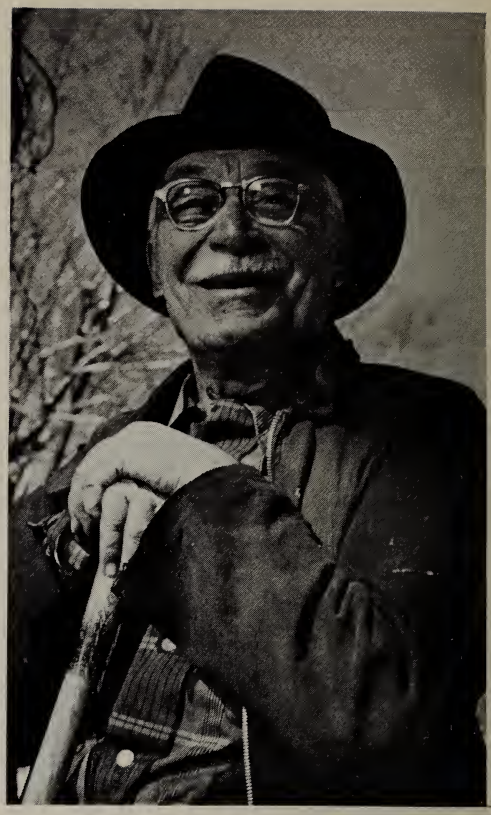
The Ontario Federation of Anglers and Hunters descends from a parent body formed on March 27, 1925, when 52 men met in Central Y.M.C.A., Toronto, and joined together as the Toronto Anglers' Association for the purpose of conserving the game fish resources of the Province.

Charles N. Candee was elected honorary president; Walter Davidson, president; George A. Warburton, Vice-president; Harold S. Kearns, treasurer; John Mossop, secretary; and T.W. Jull, Joseph Clark, H. Begg, J.B. Kennedy and Dr. Norman Wilson, directors.

Founding members included Dr. Arthur B. James, Col. Michell, Garnet Bell, Frank Whittemore, Stanley N. Schatz, Gregory Clark, well-known writer who contributed helpful news and comment in his column in the Toronto Star, and Professors W.J.K. Harkness and J.R. Dymond who assisted importantly in phrasing the principles of conservation which became the policy of the Association.

In the following years, Messrs. Warburton, Kearns, Michell, Jull and William Douglas succeeded as presidents. Mr. Schatz became secretary in 1927 and continued in that capacity until 1938.

Within two years, the Association had 2,500 members. Early meetings were held in the City Club Room on Adelaide Street, then in Foresters Hall



Our author in his garden, Toronto. Mr. Walkinshaw is an active conservationist with an especial interest in the maskinonge culture project of the Province. He was president of Toronto Anglers and Hunters Association in 1937.

on College Street, next in the King Edward Hotel, and finally in the Eaton Auditorium on College Street. From 1927 to 1935, the average attendance was about 450. The last move enabled the Association to greatly enlarge its activities indoors; fine speakers and films were engaged, and the hall was filled at every meeting. Early projects included essay contests, publication of a book on game fish conservation,

and investigation of bass, trout and maskinonge in Ontario by means of questionnaires.

In 1927, the Association succeeded in having the opening of the bass season moved from June 15th to July 1st. In the same year, it asked for a $1.00 rod licence for Ontario anglers, and it further petitioned the government to undertake a survey of the game fish situation. As a result, the Special Fish Committee was appointed on May 24, 1928.

The Committee's report, one of the best made in the Province, was presented on March 25, 1930. It was signed by Hon. Finlay G. Macdiarmid (chairman), Charles N. Candee of the Federation, and Professor Benjamin A. Bensley, head of the Department of Zoology, University of Toronto. Professor Harkness acted as secretary. The clubs and organizations which contributed are listed in Table II.

The Ontario Federation of Anglers was formed on March 23, 1928, at a meeting called by President Warburton of the Toronto Anglers' Association. Mr. Warburton was elected the first president of the provincial group. The following clubs were represented at the meeting:-

Bobcaygeon Game and Fish Protective Association, Fenelon Falls Anglers' Association, Hamilton and District Angling and Casting Association, Hespeler Gun Club and Game Protective Association, Huntsville District Game and Fish Protective Association, Victoria-Haliburton Game and Fish Protective Association, Orillia Anglers' Association, Peterborough Game and Fish Protective Association Tamarac Fishing Club of Port Elgin, Sudbury Trout Club and, of course, the Toronto Anglers' Association.

The new Federation, representing various local associations throughout the Province, made a formal presentation of recommendations to the Special Fish Committee on January 9, 1929. Individual delegates spoke on the recommendations or outlined the needs of their own communities.

Later recommendations of the Federation, speaking for large numbers of sportsmen throughout the Province, led in 1931 to the appointment of the Special Committee On The Game Situation which reported on February 20, 1933. The Committee included Hon. W.D. Black as chairman, P.F. Cronin as secretary, F.E. Hollingsworth of Sault Ste. Marie, Jack Miner of Kingsville, and six MPP's.

In 1947, hunters' organizations joined the Federation to form the Ontario Federation of Anglers and Hunters.

TABLE I CONSERVATION ORGANIZATIONS OF 1890---92

A partial list of organizations which gave assistance to Royal Commission on Game and Fish

Aberdon.	The Aberdon Gun Club (34 American and 9 Canadian members)
Alton	The Alton Fishing Club
Canard	Canard Flats Club

Colchester	Camp Palmer (Colchester North)
Fort Frances	Sabaskong Guides and Outfitters Association
Guelph	The Guelph Gun Club (G.A. Richardson, sec'y)
Haileybury	Temiskaming Fish and Game Protective Association
Hamilton	Wildfowler's Gun Club
Iroquois Falls	Iroquois Falls District Rod and Gun Club
Kemptville	Kemptville Fish and Game Club
Kenora	Kenora Board of Trade
Kingston	Kingston Gun Club
Leamington	Leamington Gun Club
London	London District Fish, Game and Insectivorous Bird Protection Society (1877)
	London Gun Club
Magnetewan	Magnetewan Sporting Club (J. Murdoch, sec'y)
North Bay	Sportsmen of North Bay Locality
	Nipissing Fish and Game Protective Association
Orangeville	Orangeville Gun Club (J.C. Fox, pres)
Petawawa	Petawawa Camp Fish and Game Club
Port Arthur	Thunder Bay and District Fish and Game Protective Association
Ridgetown	Ridgetown Gun Club
Sault Ste. Marie	Algoma Game, Fish and Forest Association
Smiths Falls	Smiths Falls Fish and Game Protective Association
St. Anns	St. Anns Gun Club
St. Catharines	St. Catharines and Lincoln County Fish and Game Protective Association
St. Clair	St. Clair Flats Shooting Club
Sudbury	Sudbury District Game and Fish Protective Association
Toronga	Ochtawan Sporting Club (J.B. Henderson, sec'y)
Turkey Point	The Turkey Point Company
Windsor	Keystone Gun Club (Geo. Cheyne, sec'y)
	Kent Angling and Hunting Association
	Provisional County of Haliburton Fish and Game Committee
	The Anglers Association of the St. Lawrence River
	Ontario Hunters Game Protective Association.

TABLE II "SOCIETIES OF CONSERVATIONAL OUTLOOK"

List of organizations given in Report of the Special Fish Committee, 1928-30
*(*Ontario Federation of Anglers)*

Athens	Charleston Lake Association
Bobcaygeon	*Bobcaygeon Game and Fish Protective Association

Brockville	Brockville Game and Fish Protective Association
Campbellford	Game and Fisheries Association
Chaffey's Locks	*Chaffey's Locks Fish and Game Protective Association
Exeter	Huron Game and Bird Protective Association
Fenelon Falls	*Fenelon Falls Anglers' Association
Fort William	*Fort William Fish and Game Protective Association
Georgian Bay	*Georgian Bay Cottagers' Association
Honey Harbour	*Honey Harbour Cottagers' Association
Hamilton	*Hamilton and District Angling and Casting Association
Havelock	Game and Fisheries Association
Hespeler	*Hespeler Gun Club and Game Protective Association
Huntsville	*Huntsville District Game and Fish Protective Association
Kenora	Kenora Fish and Game Committee of Board of Trade
Kingston	*County of Frontenac Fish and Game Protective Association
Lindsay	*Victoria-Haliburton Game and Fish Protective Association
London	London Angling Club
	Western Ontario Fish and Game Protective Association
Marmora	Marmora Booster Club
Midland	The Georgian Bay Anglers' Association
Magnetewan	Magnetewan Pioneer Association
Malachi	Malachi Campers' Association
North Bay	*Nipissing Fish and Game Protective Association
Niagara Falls	*Niagara Falls Hunters' Game and Fish Protective Association
Orillia	Orillia Anglers' Association
Oshawa	* Oshawa Anglers' Association
Ottawa	Ottawa Game and Fish Protective Association
Parkhill	Game Protective Association
Peterboro	*The Peterboro Fish and Game Protective Association
	Peterboro Chamber of Commerce
Port Hope	Port Hope Fish and Game Protective Association
Port Arthur	*Port Arthur Game and Fish Protective Association
Port Elgin	*Tamarac Fishing Club
St. Thomas	Southern Counties Game Protective Association
Sault Ste. Marie	*Algoma Game, Fish and Forest Association
Sharbot Lake	Frontenac Game and Fish Protective Association
Smiths Falls	*Smiths Falls Anglers' Association
Stratford	*The Stratford Anglers' Association
Sudbury	*Sudbury District Game and Fish Protective Association
	*Sudbury Trout Club
Thornbury	Grey County Fish and Game Protective Association
Timmins	*Porcupine Rod and Gun Club
Toronto	*Ontario Hunters' Game and Fish Protective Association
	*Toronto Anglers' Association
Trent River	Game and Fisheries Association.

Aerial view of typical sharptail habitat in Hudson Bay Lowlands.

NORTHERN SHARPTAILS MOVE SOUTH

by M.R. Wolfe
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(Photos by H.G. Lumsden)

On October 9, 1967, a moose hunter reported seeing nine sharptails in a bog 20 miles north of Cochrane. At the time, this was not considered significant since a few sharptails are found in the Cochrane area every year. However, on November 13, several flocks were observed northwest of Cochrane, and by November 15 it was obvious that a major migration was taking place as flocks were being reported from widely scattered localities far south of their normal range.

Where did they come from? Where are they going? How many were there? Why did they come?

Two races of sharptailed grouse occur in Ontario: the prairie sharptails of agricultural areas of Manitoulin Island and the Rainy River region, and the northern sharptails found in the muskeg country. Although quite similar in appearance, the more northern, forest-inhabiting race is somewhat darker than its southern, prairie relative.

The sharptail is a brownish coloured, chicken-like bird about the size of a ruffed grouse. Since it has a short, pointed tail, and the wings appear to be set far back on the body, when in flight, it reminds one of a delta winged aircraft. In the hand, the most striking feature is the heavy feathering on the legs. Unlike that of the ruffed and spruce grouse, it extends down onto the toes, giving a snowshoe effect.

The northern sharptail, like the prairie race from which it probably decended, is an open-country bird. The 125,000–square-mile Hudson Bay Lowlands, where the bird is most abundant, is the largest block of continuous muskeg in the world. As with most muskegs, this area is characterized by its stands of stunted black spruce and tamarack. Much of the Lowlands consists of relatively open, shrubby, waterlogged moss and sedge areas. These are the habitats used by the northern sharptail.

Not all of the muskeg types are suitable for sharptails. However, in consideration of the immense area involved, the total northern sharptail population must be very large, indeed, even if the average density of birds is relatively low.

Earlier in the year, few sharptails were seen in the vicinity of Cochrane, and it was felt that the local population was the lowest that it had been in recent years. It certainly could not have produced the large number of birds present in November and December. By deduction, the conclusion was reached that they must have emigrated from the Hudson Bay Lowlands.

Between late October and early December, flocks of as many as 40 sharptails were observed flying over Moosonee in a southwesterly direction. Most of these flocks contained from 10

"Ritual fighting" between two male sharptails. Frequently, no blows are struck.

to 15 birds. Trappers in the Moosonee area reported more sharptails than usual in the Lowlands during November and early December, but that many of them had disappeared by the end of December. This is fairly good evidence that a southward emigration of sharptails did take place.

The last major flight of northern sharptails was in the fall of 1932. During that flight, which was much larger than the one of 1967, birds penetrated as far south as Bracebridge. Fair numbers of birds were reported as far south as North Bay and Sudbury. The western limit of this major emigration was probably in the vicinity of Armstrong.

Although the 1967 flight was not nearly as extensive, the birds did travel as far south as Swastika and Chapleau. In general, they were not found in high densities except in areas where a few birds are occasionally reported in normal years.

The flight appeared to represent a movement of birds from the northern range to the submarginal areas in the south. It halted north of a line running west from Matheson, south of Timmins, through Hornepayne, south of Geraldton to Collins on the C.N.R. west of Lake Nipigon. Only scattered flocks occurred south and west of this line. The area of greatest abundance was near Kapuskasing and Cochrane.

How many birds were involved in this irruption? No accurate estimate can be given because of the large area involved, but there must have been many thousands. In Kapuskasing District, at the peak of the migration in late November, several flocks of from 40 to 50 birds were seen, and one flock of more than 100 birds was reported. In Cochrane District, the average flock size was from five to 10 birds, and

"Upright advance" posture of male sharptail on dancing grounds at breeding time.

Conservation Officers reported seeing 942 birds in 56 different townships. By late December, there were a few birds in almost every suitable bog in the Cochrane area.

Migrations such as this are believed to be associated with high densities and caused primarily by population pressures. In this case, there is little evidence to indicate that the population was at a high level in 1967. There were several persons travelling and working in the muskeg country in the early part of that summer and, to the best of our knowledge, none of them reported seeing exceptionally large numbers of birds. However, a crew, conducting aerial surveys of caribou in March of 1967, did remark that a large number of sharptails were seen.

The summer of 1967 was relatively warm and dry. It may have been an exceptionally good year for sharptail breeding and for survival of the young. If the birds did have an especially good reproductive year, it is still possible that they might not be reported. In July and August, when these young birds would be visible, travel is exceedingly difficult in the muskeg, and few observers would have been in a position to see many birds. Thus, the possibility cannot be ruled out that the population in the fall of 1967 might have been particularly high as the result of an exceptionally successful reproductive season.

What factors, other than population size, could have been responsible for the emigration? A certain amount of southward movement in the fall is normal for northern sharptails. This may be a movement to better winter cover. Perhaps the emigration of 1967 was an abnormal expression of a normal movement, and we should be asking, "Why

did such a large number of birds move so much farther than usual?" We do not presently know the answers to this question, but a large sample of these birds has been collected, and preliminary examination has indicated that the migrating group was comprised almost entirely of grouse hatched in the spring of 1967.

What will be the fate of these birds? After the 1932 flight, they dispersed during the winter and had practically disappeared from some areas before the following spring. No return flight to the north was reported. A few birds did nest in scattered locations in 1933, but most of them had disappeared by the following spring. Some hung on longer, and a few small permanent nesting populations were established.

We can expect that the same thing will happen in 1968. Many of the birds will not survive the winter and few will nest. Possibly, a few nesting populations will be established in the better habitats but, except in local situations, these cannot be expected to contribute significantly to the upland game population in the accessible parts of the north.

Since most of the emigrant birds were already doomed, the Department extended the sharptail hunting season to March 31 to give hunters an opportunity to harvest as many as possible of these birds before they were gone. The upland game hunter was given the opportunity to participate in a sport of a quality that is not often found in the north.

Since northern ruffed grouse are found in dense cover and are quite tame, few are shot on the wing. The sharptail, on the other hand, is found in open situations and is often quite wary. It makes an excellent target for the wing shooter armed with a trusty shotgun.

Any hunter interested in sharptails should learn to recognize a brush shrub commonly known as bog birch. The flower buds of this plant are one of the most important winter feeds of northern sharptails, and birds are usually found in bogs where it is abundant. Hunting effort should be concentrated in these bogs. Sharptails are also found in open, burned and cutover areas, especially if white birch is present.

When the weather is cold, sharptails are active throughout the day and exceptionally wary. On such days, they usually flush at long range and provide challenging sport. However, they do have one downfall. After the first flush, they will often land in the tops of trees where they apparently feel quite safe. In such situations, they can be easily approached to within shotgun range. Wariness also seems to be related to flock size. The larger flocks are more easily flushed, fly further, and usually do not land it trees.

The flesh of sharptails is dark, and most hunters do not find them as delicious as ruffed grouse. However, they are considered by many hunters to be superior to spruce grouse, and they do make a very good meal when properly prepared.

The 1967 emigration of northern sharptailed grouse may not be repeated in the near future. We, who have been able to observe this phenomenon and take advantage of the sport provided, feel very fortunate, indeed, and hope we will not have to wait another 35 years for it to reoccur. There is reason to be optimistic. Early reports from the muskeg indicate that the spring breeding population is unusually high.

Is it possible that the birds that moved south in 1967 were merely the vanguard of an even bigger flight that will take place in 1968?

THE UPS AND DOWNS OF KAWARTHA WALLEYES

by J.J. Armstrong
Biologist, Lindsay Forest District
(Photos by the Author)

Spring is usually greeted as the time for the appearance of new life. It is also a critical time for the young of most animal species since reproductive success is largely dependent upon vagaries of weather at this time of year. In the case of land animals, effects of weather are primarily direct, whereas with adult and young fish, weather indirectly modifies the fishes' environment. A cold snap in the spring could cool the water and affect fish in terms of temperature. At the same time, other forms of life associated with fish are also affected, to the fishes' detriment or advantage. Indirect effects of weather upon fish are common, and apparently a major factor in the tremendous variations in year-class strength encountered in most species.

In Minnesota, Kramer and Smith (1962) found that strength of year-classes in largemouth bass was pinpointed to the period between egg deposition and the time when bass fingerlings were two weeks old. While survival of eggs and fry was found to be directly related to water temperatures, the greatest single influence in the formation of year-classes was wind, through its effects on the substrate upon which bass nests were situated.

After lengthy studies in waters of Manitoulin Island, Fry and Watt (1957) found a close relationship between water temperatures and year-class strength in the smallmouth bass. They found that, with higher water temperatures from July to October, the chance for the production of a dominant year-class of smallmouth bass was greater.

The late Professor J.R. Dymond often referred to the large variations in year-class strength in lake herring populations of Lake Erie. According to Dymond (1964) there were peaks in the production of lake herring in Lake Erie in 1912, 1917, 1920 and 1924, while low catches were experienced in 1916, 1919, 1921 and 1926. After the high production of 1924, lake herring were scarce for more than twenty years. In 1945 and 1946, excellent catches were again taken. When a sample of these fish were aged, the greatest proportion was found to have originated in the spawning of 1943, a year in which the herring population was much smaller than in 1946. Although a much higher herring population was present in 1946 than in 1943, the spawning in 1946 produced only a few fish to be caught in 1949, 1950 and 1951.

Hile (1950) reported that a most successful hatch of walleyes occurred in 1943 in Green Bay of Lake Michigan, and this probably arose as a result of favourable weather conditions. The increase in the walleye population and harvest was phenomenal. From a production of 21,000 pounds taken commercially in 1945, the harvest in 1948

reached 572,000 pounds.

Most recently, several strong year-classes of walleye have been observed in Ontario waters. The 1959 year-class of walleyes was observed to be strong in the Forest Districts of Fort Frances, Kenora, Sault Ste. Marie, Sudbury, Parry Sound, Aylmer, Lindsay, Tweed and Kemptville. Reports of a moderately successful year-class produced in 1962 have been received from various localities throughout Ontario.

It is interesting to note that the large 1959 year-class of walleyes produced in Lake Ontario and Lake Erie resulted from a high population of spawners in Lake Ontario and a low population of spawners in Lake Erie. Apparently, year-class strength bears little relation to spawning stock density in the case of the walleye.

Large fluctuations in the walleye populations of the Kawartha lakes (situated on the Trent Canal system in Lindsay District) led to the establishment of a Fisheries Management Unit there in 1963 to study these phenomena and to make recommendations for sound fisheries management. In the initial stage, a netting survey was conducted on Pigeon and Sturgeon lakes at a time when the 1959 year-class (then four years old) was first entering the fishery in substantial numbers. Subsequent netting surveys in 1964 and 1965 provided data on the passage of this year-class through the fishery.

The 1959 year-class comprised approximately 50 per cent of all fish captured in the experimental nets set in both lakes in 1963. During the following year (1964), the percentage of this year-class, relative to the total catch in both lakes, had decreased appreciably, particularly in Sturgeon Lake. In 1965, this year-class was still conspicuous in the Pigeon Lake sample but was masked in Sturgeon Lake as a result of the large year-class of 1962 which entered the netting sample at three years of age. These three-year-olds were not apparent in the Pigeon Lake sample in 1965. In both lakes, the contribution of the 1959 year-class was lower than previous years.

Although precise reasons for the creation of these two strong year-classes are unknown, it is probable that spring and summer weather conditions were sufficiently favourable to allow high survival of eggs and fry. These resulted in the large recruitment observed in 1963 and 1965 when the fish became large enough to be caught in trap nets and taken by anglers. However, weather conditions only partly explain observations made on contributions of these two year-classes to the fisheries of the two lakes.

Observations, on the quality of spawning areas used by walleyes, indicated that Sturgeon Lake possesses much better spawning facilities than Pigeon Lake. These observations lead to an interesting hypothesis that would partially explain the somewhat differing contributions of year-classes to the two lakes. Given similar numbers of spawning walleyes in each lake, survival of eggs should be higher in Sturgeon Lake than in Pigeon Lake because of better spawning facilities in the former, and subsequent recruitment to the fisheries would be higher. However, when environmental conditions are such as to increase egg survival in the poorer-quality spawning areas of Pigeon Lake,

a good year-class could result.

There is some evidence to support this hypothesis but not sufficient to present a clear explanation. If this hypothesis is true, one would expect higher rates of total mortality in the walleye population of Sturgeon Lake than in Pigeon Lake. Apparently this is the case, since the average rate of total mortality over three years of study was 44 per cent in Sturgeon Lake compared to 34 per cent in Pigeon Lake.

To some extent, the appearance of a strong year-class is reflected in the

SUCCESS AT BOBCAYGEON

At low water in March, gravel was deposited on 3,600 square feet of river bottom to create more favourable spawning areas for walleye in Pigeon Lake. This followed a controlled experiment in 1966 when small areas were covered with gravel; egg sampling screens were placed on treatment areas and on untreated areas of equal size.

After the walleye spawning season had ended, more than 22 times more eggs were found on the treatment screens than on the control screens, and the number of live eggs was approximately six times as high. It is reasonable to assume that many of these eggs would have been lost without the treatment.

Again, in 1967, the results were phenomenal. Literally hundreds of walleye were observed over the treatment areas during the spawning period. In fact, they appeared to be attracted to the gravelled areas, and additional treatments of similar size were scheduled for 1968.

If this project is successful, the first progeny from the 1967 spawning should appear in substantial numbers in the Pigeon Lake fishery in 1971. The fishery may improve significantly in the future.

rate at which walleye are taken by anglers (Table I). In 1963, when the 1959 year-class was first entering the angler's catch in significant numbers in Sturgeon Lake, angling success was high (0.33). During 1964 and 1965, angling success progressively diminished as the poor year-classes of 1960 and 1961 entered the fishery. In 1966, when the strong 1962 year-class became available, angler success increased (0.28). In the next year, angler success dropped to 0.21 walleye per rod hour.

A similar pattern appears to be present in Pigeon Lake although this is not nearly as clear. Angler success rate (0.15) was relatively high in the 1963 season but declined slightly in 1964 and 1965. Unfortunately, the rate of capture could not be calculated for 1966, but it is likely that it was high owing to the fact that the large 1962 year-class entered the fishery that year. The presence of this year-class explains the higher catch rate (0.14) in 1967.

This leads to some predictions on the fisheries of Sturgeon and Pigeon Lakes for 1968 and 1969. Since the year-class of walleye produced in 1964 was not exceptionally large, angling success should not be higher than that experienced in 1967. Conversely, since unusually large numbers of young-of-the-year walleye were observed in 1965 in various waters in Ontario including nearby Rice Lake, it is expected that angling success should again increase in 1969, provided these fish do not suffer greater mortality than usual.

TABLE I WALLEYE PER ROD-HOUR

Year	Sturgeon Lake	Pigeon Lake
1963	0.33	0.15
1964	0.25	0.13
1965	0.23	0.10
1966	0.28	not available
1967	0.21	0.14

The appearance of large year-classes in the Kawarthas has recently followed a regular three-year pattern of abundance from 1959 to 1965. Normally, however, such regular periodicity is unusual as has been demonstrated in other studies.

Large changes in year-class strength can pose serious problems to those managing fisheries for the benefit of the public. The work being carried out by the Kawartha Lakes Fisheries Management Unit, and in other similar studies throughout the province, will lead to enlightened fisheries management and eventually result in better fishing.

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Unloading gravel for the benefit of spawning walleye at Bobcaygeon.

Close-up of gravel bed that attracted spawning walleye at Bobcaygeon.